

REMARKS

Reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

The claims currently pending in the application are 1-12, inclusive. By this amendment, claim 1 has been amended.

Claims 1-12 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claims 1-12 also stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. Both of these rejections are respectfully traversed.

In claim 1, Applicants have amended the particle size of the titanium powder --1 to 5 nm -- in lines 2-3 and lines 8-9. The range is supported at page 4, line 17 and page 5, line 12 of the as-filed specification.

Further, in line 6 of claim 1, the temperature range now reads 20 to 40° C.

It is respectfully submitted that in view of these amendments to claim 1, the new matter rejection under the first paragraph of § 112 and the indefiniteness rejection under the second paragraph of § 112 have both been overcome. Withdrawal of these rejections is respectfully solicited.

Claims 1-6 and 8-12 stand rejected as anticipated under § 102(b), or in the alternative, as obvious under § 103(a) over the 2002 article by Reddy and the 2001 article by Reddy. These rejections are respectfully traversed.

The 2002 article by Reddy discloses the synthesis of titanium dioxide, predominantly in the anatase phase, with an average grain size of 5-10nm. The synthesis method comprises the dropwise addition of an aqueous solution of hydrazine hydrate (100%) to a vigorously stirred, acidic aqueous solution of titanium tetrachloride (20%), until the pH reaches 8. The solution is then stirred for four (4) hours to form a hydrous

titanium oxide precipitate, the precipitate then being filtered, dried overnight at 80°C, and subsequently *calcined* at 400°C to form titanium dioxide.

The 2001 article by Reddy discloses a process which comprises the dropwise addition of an aqueous solution of hydrazine hydrate (5M) to an aqueous, acidic solution of titanium tetrachloride (3M) until the final pH is between 7.5-8.0. The precipitated $\text{TiO}_2 \cdot n\text{H}_2\text{O}$ is filtered, washed, dried overnight, ground to a fine powder and *calcined*.

By contrast, the process of the claimed invention distinguishes over the teaching of Reddy 2002 and Reddy 2001 in that hydrazine monohydrate solution (10-99% v/v) is added dropwise to a stirred, acidic, aqueous solution of titanium tetrachloride (5-50%v/v) at a temperature between 20 to 40°C to form a titanium dioxide precipitate *directly*, without the necessity of a subsequent calcination step.

Further, it can be seen from the examples in the present invention that a solution to the problem posed is provided since the need for a calcination step for the formation of the nanocrystalline anatase is eliminated. The formation of nanocrystalline anatase is achieved at ambient temperature by controlling the reaction conditions, such as the concentrations of the starting precursor titanium tetrachloride and the hydrazine hydrate.

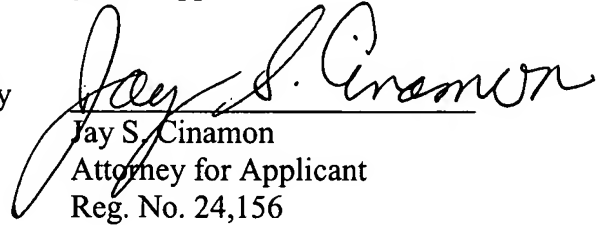
It is respectfully submitted that the claims distinguish over Reddy 2002 and Reddy 2001 in the sense of § 102(b) and § 103(a). Accordingly, since a *prima facie* case of anticipation and obviousness has not been established, the rejections are deemed to have been overcome and their withdrawal is solicited.

Please charge any fees which may be due and which have not been submitted
herewith to our Deposit Account No. 01-0035.

Respectfully submitted,

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